

USAWC STRATEGY RESEARCH PROJECT

THE PROMISE AND PERIL OF THE NEW STRATEGIC TRIAD

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ABSTRACT

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A mechanism for reviewing and establishing US nuclear policy is the Nuclear Posture Review (NPR). Because of the changing strategic environment resulting from the improved U.S. relations with Russia and the rising threat from regional state and non-state actors the 2001 NPR described significant changes to US nuclear policy and specifically US nuclear force structure.

One of the significant changes announced in the 2001 NPR was the description of a new triad. The traditional triad or old triad referred to strategic nuclear weapons consisting of land based intercontinental ballistic missiles, bombers, and sea launched ballistic missiles. The new triad calls for the incorporation of new capabilities to meet the threats that have arisen from the new strategic environment. It adds non-nuclear global strike weapons to the nuclear weapons and delivery systems of the old triad and moves them to one leg of the new triad. It further calls for the continued development and fielding of ballistic missile defense systems which will make up the second leg of the new triad. The third leg will consist of a robust and responsive infrastructure. The focus of this responsive infrastructure will be both to maintain current strategic capabilities and to respond to new and emerging threats if needed. A robust and redundant command, control, intelligence, surveillance, and reconnaissance system will be at the center of this new triad.

The old triad evolved as a result of the threats of the Cold War, the new triad replaces it with a structure designed to meet the threats of the new strategic environment. These changes will have both positive and negative impacts on deterrence, strategic warfighting, crisis stability, and arms control. Although the new triad could improve deterrence, the addition of non-nuclear global strike weapons has the potential to blur the line between conventional and nuclear war and to degrade crisis stability. Additionally, the new triad might have a negative effect on arms control because the proposed number of warheads to be maintained by the United States through implementation of the 2001 NPR indicates a willingness to retain significant nuclear capability for the foreseeable future.

TABLE OF CONTENTS

ABSTRACT	III
ACKNOWLEDGEMENTS	VII
LIST OF ILLUSTRATIONS	IX
LIST OF TABLES	XI
THE PROMISE AND PERIL OF THE NEW STRATEGIC TRIAD.....	1
INTRODUCTION.....	1
THE NUCLEAR POSTURE REVIEW.....	1
THE OLD TRIAD	4
GENERAL.....	4
PURPOSE AND MISSION.....	4
STRENGTHS AND VULNERABILITIES OF THE OLD TRIAD.....	5
SUMMARY	6
THE NEW TRIAD.....	7
GENERAL.....	7
NUCLEAR AND NON-NUCLEAR STRIKE	8
BALLISTIC MISSILE DEFENSE.....	8
RESPONSIVE INFRASTRUCTURE	9
COMMAND, CONTROL, INTELLIGENCE, AND PLANNING.....	11
STRENGTHS AND VULNERABILITIES OF THE NEW TRIAD.....	11
SUMMARY	12
REASONS FOR THE NEW TRIAD.....	13
A NEW U.S – RUSSIAN STRATEGIC RELATIONSHIP.....	14
THE RISE OF TERRORISM AND NEW ASYMMETRIC THREATS.....	14
OTHER EFFECTS OF THE NEW TRIAD.....	16
STRATEGIC DETERRENCE	16

STRATEGIC WARFIGHTING.....	18
CRISIS STABILITY.....	20
ARMS CONTROL	20
CONCLUSION.....	22
ENDNOTES.....	27
BIBLIOGRAPHY	33

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LIST OF ILLUSTRATIONS

FIGURE 1.....	2
FIGURE 2.....	4
FIGURE 3.....	8
FIGURE 4.....	10
FIGURE 5.....	18
FIGURE 6.....	25

LIST OF TABLES

TABLE 1.....	6
TABLE 2.....	13
TABLE 3.....	18
TABLE 4.....	22
TABLE 5.....	23

THE PROMISE AND PERIL OF THE NEW STRATEGIC TRIAD

INTRODUCTION

For over 50 years the United States has been developing policy for the employment of nuclear weapons. The policy evolved from massive retaliation during the Eisenhower administration to flexible response during the Kennedy administration and to the cooperative response of the Clinton administration.

With the end of the Cold War and corresponding dissolution of the Soviet Union over 11 years in the past, coupled with significant new and emerging threats to the security of the United States, the time is right for the current administration to establish a new nuclear weapons policy. One of the mechanisms for establishing nuclear policy is the congressionally mandated Nuclear Policy Review. The 2001 Nuclear Policy Review (NPR), released in 2002, made some significant departures from previous Nuclear Posture Reviews. Since the early 1960's US nuclear defense posture has been based on a triad of nuclear delivery systems.¹ This triad consisted of long-range bombers, land based intercontinental missiles and sea launched ballistic missiles. One of the significant changes announced in this latest NPR was the description of a new strategic triad. Although this new triad has not been officially incorporated into US doctrine, it will most likely be written into joint publications in the near future. This paper will discuss the decision to create a new strategic triad. It will give a description of both the new triad and the old triad and offer some possible reasons why this new policy was announced. It will also discuss the impact of this new policy on deterrence, strategic warfighting, crisis stability, and arms control. The paper will conclude with some suggested improvements to the new triad.

THE NUCLEAR POSTURE REVIEW

The results of the first DoD NPR were announced on 22 September 1994. Secretary of Defense Les Aspin called it "the first DoD nuclear policy study ever to incorporate revisions of policy, doctrine, force structure, operations, safety and security, arms control in one study."² The 1994 NPR was the first thorough review of the role and structure of US nuclear forces since President Carter's Presidential Decision (PD)18, U.S. National Strategy, issued in 1977, directed reports on the Nuclear Targeting Policy, the ICBM Force, and the Strategic Reserve Force.³ The 1994 NPR was a DoD wide collaborative effort (see figure 1).⁴

Organization for 1994 NPR EFFORT

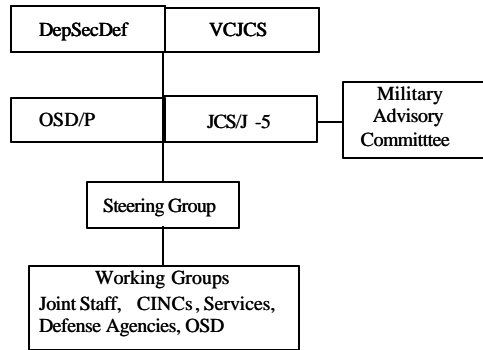


FIGURE 1

Instead of being completed at the direction of the President as in 1994, Congress officially mandated the 2001 NPR. Congressional language directed the Secretary of Defense “[to] submit to Congress in unclassified and classified forms as necessary, a report on the results of the nuclear posture review ...The report shall be submitted concurrently with the Quadrennial Defense Review...”⁵ The congressional language further specified that the Secretary of Defense shall conduct this review in consultation with the Secretary of Energy. Further, the law specified that the report include the following elements:

- 1) The role of nuclear forces in US military strategy.
- 2) The policy requirements and objectives towards maintaining a safe, reliable, and credible nuclear deterrence policy.
- 3) The relationship among US nuclear deterrence, targeting strategy, and arms control
- 4) The levels and composition of nuclear delivery systems.
- 5) The nuclear weapons complex that will be required.
- 6) The active and inactive nuclear weapons stockpile that will be required to implement US National and Military Strategy.⁶

The 2001NPR was a collaborative effort written by a similar collection of offices as the 1994 report and was co-chaired by senior Department of Defense and Department of Energy officials.⁷

Nearly 15 years passed between the PD 18 directed reports and the 1994 NPR and over seven years passed between the 1994 NPR and the most recently released NPR. Billions of dollars are spent on US strategic nuclear weapons every year to maintain a force that can completely destroy the entire world, yet the Defense Department has only conducted a comprehensive review three times in the last 22 years.

The strategic landscape was considerably different in the mid 1980s than it was when the 1994 NPR was published. Likewise, the strategic landscape is considerably different now than it was in 1994. In 1994, the dissolution of the Soviet Union was only 3 years old. Although the Cold War was over and the strategic power retained by Russia had declined, it still maintained enough operational nuclear forces to bring devastating damage on the United States intentionally or by accident.⁸ There was also residual fear concerning post cold war Russia's long-term orientation. Specifically, there was concern whether Russia would become more nativist, move towards strengthening relations with China, or adopt a pro-West direction when making its own nuclear policy decisions.⁹ The 1994 Nuclear Posture Review focused on structuring the force to deter both a nuclear war with Russia and to meet operational requirements of assured destruction of Russian targets if necessary. The 1994 NPR was also written taking into consideration the constraints of the START I treaty and with the anticipation of other follow on arms control treaties (START II and START III).¹⁰

The most recent NPR was written in the backdrop of a completely different strategic environment. On 11 September 2001 the United States suffered the worst terrorist attacks in its history. The strikes on the World Trade Center towers and the Pentagon and the crash of hijacked United Airlines Flight 93 in western Pennsylvania, greatly altered threat perception. Approximately eight months later, President Bush and President Putin signed a treaty to reduce the respective US and Russian nuclear weapon arsenals to the range of 1700-2200, the lowest level in decades. Equally important was the signing of a joint declaration of the new strategic relationship between Russia and the United States¹¹. The 2001 NPR pointed out that nuclear weapon capability continues to proliferate and that 28 countries have ballistic missiles, 13 have biological weapons, and 16 have chemical weapons.¹² The 2001 NPR was written in recognition that the strategic relationship between Russia and the United States has improved, but the larger strategic environment is still uncertain, particularly when it comes to terrorism and weapons of mass destruction (WMD).

When the new NPR was briefed to Congress in January of 2002 it included the description of a new strategic triad. Although this new triad is designed to provide the strategic capabilities needed for this new strategic environment, it will also have impacts on US nuclear deterrence policy, strategic warfighting, crisis stability, and arms control. Before discussing these impacts, an explanation of both the old and new triads will be presented in the following paragraphs.

THE OLD TRIAD

GENERAL

During the Cold War the term, “strategic triad” described the three main components of our nuclear weapons force structure.¹³ This force structure consisted of nuclear bombs and cruise missiles delivered by long range aircraft (bombers), land-based intercontinental ballistic missiles (ICBMs), and sea-based submarine launched ballistic missiles (SLBMs). These components made up the legs of the traditional strategic triad, normally depicted as shown in figure 2.¹⁴

Traditional Strategic Triad

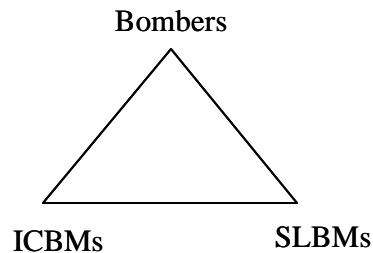


FIGURE 2

PURPOSE AND MISSION

Until recently, the mission of the triad of bombers, ICBMs and SLBMs was primarily focused on one adversary. This adversary was the Soviet Union and – subsequent to the dissolution of the Soviet Union – Russia. With respect to this adversary, the mission of the nuclear-armed bombers, ICBMs, and SLBMs was to deter a nuclear attack on the United States. If deterrence failed, the triad’s mission would be nuclear warfighting. Specifically the triad would provide a mix of nuclear forces to provide assured destruction of important targets within Russia. In addition to these two major missions, this triad has taken on other missions or purposes.

Other important missions of the nuclear triad included providing extended deterrence to US allies, and deterring the use of chemical and biological weapons against the United States. Extended deterrence is the policy by which the United States guarantees the security of key allies with its nuclear arsenal. Extended deterrence, although a secondary mission, has served an important military role for US nuclear forces in that it has reassured our key allies that a nuclear strike or even a non-nuclear attack – as in the case of the potential Soviet attack into

central Europe during the Cold War- would be cause for a nuclear response from the United States. This has allowed France and Great Britain to maintain small nuclear forces. More importantly it has provided other key allies the security assurance necessary to eliminate or reduce the need to build any nuclear arsenals at all (e.g., Germany and Japan).

Deterring other weapons of mass destruction such as chemical and biological weapons has also been an important mission of the US nuclear arsenal. A recent example of this policy was during the 1991 Gulf war when the United State made it clear that there would be “catastrophic consequences” if Iraq were to use chemical weapons.¹⁵ Although not specifically mentioned, it was understood that these catastrophic consequences would potentially include retaliatory strikes using US nuclear weapons.

In order to accomplish these missions, the triad needed to be responsive, survivable, and flexible. Each of these characteristics was met by the unique strengths of the specific legs of the old triad. These strengths as well as some inherent vulnerabilities will be discussed in the following paragraphs.

STRENGTHS AND VULNERABILITIES OF THE OLD TRIAD

Each system within the “old triad” brings about individual strengths and vulnerabilities. The major strength of bombers delivering nuclear weapons is that they can be recalled after takeoff. Unlike unmanned missiles that once fired cannot be recalled, manned bombers offer a nuclear war “slow fuse” in that they allow for an additional chance to de-escalate from a crisis even after the weapons (nuclear armed bombers) have been launched. Another advantage of bombers is that once airborne they are reasonably survivable against a counterforce nuclear attack since the incoming missiles would normally be aimed at the airfields from which they departed. On the other hand, one of the key vulnerabilities of bombers delivering nuclear weapons is that they could be easily destroyed on the ground during a no notice nuclear weapons attack. An additional vulnerability of bombers is that major advancements in air defense systems have made it more difficult for them to penetrate enemy territory. Delivery of nuclear armed cruise missiles from strategic bombers has somewhat alleviated this problem, but advanced air defense systems can also counter a cruise missiles attack.

The strength of land based intercontinental missiles is that they provide a quick response first strike capability. The United States Air Force maintains a force of approximately 500 Minuteman III ICBMs.¹⁶ These missiles can be launched within minutes of an order from the president. The major disadvantage of the ICBM leg of the triad is that even though they are in hardened silos, their positions are well known and, like the bombers, a no notice first strike

could destroy most if not all of the ICBMs currently fielded if hit prior to being launched. Another disadvantage of the ICBMs is that once they are fired they can not be recalled.

The third leg of the “old triad” was made up of the submarine launched ballistic missiles. Nuclear submarine launched ballistic missiles offer the key advantage of being extremely survivable. Advanced nuclear powered submarines can stay submerged for long periods of time making them difficult to detect and target. Like the ICBM force, nuclear submarines armed with SLBMs also provide a quick response and can be fired within minutes of receiving an execution order. Although communication technology has greatly improved in recent years, another disadvantage of SLBMs is that communications may be difficult due to the long distances involved and the opacity of seawater to all electromagnetic radiation except low frequencies.¹⁷

“Old Triad” Component	Strengths	Vulnerabilities
Bombers	-flexible, -hard to target once airborne	-easily destroyed during no notice counterforce attack -hard to penetrate air defenses
ICBMs	-quick response	-easily targeted known locations -inflexible, once fired, cannot be recalled
SLBMs	-quick response -survivable	-communications may be more difficult -inflexible, once fired, cannot be recalled

TABLE 1

SUMMARY

These strengths and vulnerabilities are summarized in the table above. The “old triad” worked well and was structured and exercised to meet the Cold War nuclear policy. The quick response offered by the ICBMs coupled with the flexibility of nuclear armed bombers and the survivability of the nuclear submarine launched missile force provided a credible and effective deterrent against the Soviet Union. The “old triad,” with the second strike capability afforded by the survivable SLBM force, ensured the requirements of mutual assured destruction could be

met if deterrence had failed. However, the important question that was dealt with during the writing of the most recent NPR was “how well does this structure provide capabilities to deter or respond to the current and near future security requirements?” Apparently, the answer to this question was “not very well” as the drafters of the 2001 NPR completely redesigned this “old triad” into a form they considered more appropriate for the current and future US security environment.

THE NEW TRIAD

GENERAL

The end of the Cold War prompted considerable debate over the future role of nuclear weapons and the corresponding force structure. Some experts suggested eliminating the bomber and ICBM legs of the triad, relying only on the survivable SLBM force to meet our national security requirements.¹⁸ Others, such as retired Air Force Gen George Lee Butler even argued that the United States no longer needed any nuclear weapons.¹⁹ The most recent NPR does not incorporate either of these radical approaches, but announced instead several significant changes to meet the changed strategic environment.

During Senate hearings on the 2001 nuclear posture review, Douglas Feith, Undersecretary of Defense for Policy, described this “new strategic triad” as one that adds non-nuclear strike weapons to current nuclear offensive weapons capabilities, integrates missiles defenses, develops and maintains a responsive infrastructure, and integrates all components through improved command and control, intelligence, and planning.²⁰ The old triad (at reduced numbers), with the addition of non-nuclear strike capabilities, makes up one leg of the new triad. Missile defense and responsive infrastructure make up the other two legs with all three legs held together by command and control, intelligence collection, and planning (see figure 3).

New Strategic Triad

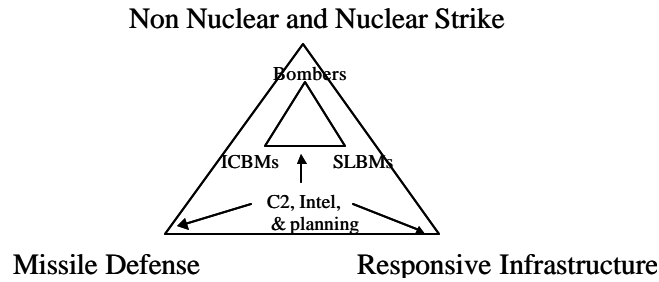


FIGURE 3²¹

NUCLEAR AND NON-NUCLEAR STRIKE

The first leg of the “new triad” includes nuclear and non-nuclear strike capabilities. The non-nuclear strike capabilities are linked with the nuclear strike capabilities which include the nuclear weapons and delivery systems from all three legs of the “old triad.” It is recognized that nuclear weapons are still necessary for current and near future strategic defense requirements but they will take on a reduced role. Because of this reduced role, the NPR explained that the number of operational nuclear weapons will continue to be reduced to the target goals of 3800 by 2007 and between 1700 and 2200 by 2012 in order to meet the numbers agreed to by Presidents Bush and Putin.²²

Non-nuclear strike capabilities in the “new triad” will include long range conventional cruise missiles and will build upon the advancements made in precision weapons.²³ It could also include new strike systems that would be deployed on converted nuclear ballistic missile submarines.²⁴ Additionally, as it is expected that an increasing number of US adversaries will be relying on computer networks and other information technology to threatening US security, an offensive non kinetic attack capability will eventually become part of the non nuclear global strike capabilities.

BALLISTIC MISSILE DEFENSE

The most significant difference between the old and new triads is the inclusion of Ballistic Missile Defense. David Martin, the US Deputy for Strategic Relations Missile Defense Agency describes the planned Ballistic Missile defense system as,

“a single, fully integrated, BMD system that will be capable of engaging all classes of ballistic missile threats, from short-range tactical missiles to missiles

with intercontinental ranges. The program will increase system robustness by incrementally deploying layered defense that use complementary interceptors, sensors, and battle management and command-and-control (BMC2) systems to provide multiple engagement opportunities against threatening targets in boost, mid-course, and terminal phases of flight....These promising technologies and approaches include kinetic (hit to kill) and directed- energy systems with various land-, sea-, and air-based options.”²⁵

The initial system has been further described as including 20 ground based- interceptors, 20 sea-based interceptors, a number of Patriot Advanced Capability-3 (PAC-3) missiles, and an upgraded radar system.²⁶ As the technology matures, other systems such as the airborne laser could also be incorporated.

There have been many articles and reports on the feasibility of the technologies that will be used to defeat incoming ballistic missiles or re-entry vehicles but less discussion has been given to the importance of the upgraded radar system that will be used to cue the missile defense system. Most of the early warning radars were built during the Cold War and were designed and oriented to detect missiles coming from launch points in the former Soviet Union. Eventually the Pentagon plans to field advanced space sensors to provide wider coverage of other regions of the world with ballistic missile programs such as the Middle East. Until advanced space based sensors can be deployed the US plans on working with allies to upgrade existing ground based radars to provide the necessary coverage of the new threat regions.²⁷

Several other key aspects of the missile defense leg of the new triad are important to note. First, this leg of the new triad is in development and will not become available even with limited capabilities until 2004. Next, the building of this national missile defense system is an expensive undertaking. Some sources have estimated the cost of developing the National Missile Defense System to be as much as \$64 billion.²⁸ Not only is it expensive, but there are many difficult technologies issues involved with the project, from unproven missile “kill” mechanisms to the need for upgraded and advanced early warning sensors. As a result of these facts, until 2004 or possible longer, the new triad is actually a dyad and only a triad on paper.

RESPONSIVE INFRASTRUCTURE

The responsive infrastructure leg of the new triad consists of the capabilities of the defense scientific, technical, and manufacturing infrastructure that will provide the United States the capability to respond to unexpected or emerging threats. A key component of this leg includes the nuclear weapons enterprise.²⁹ As part of strengthening the nuclear weapons

infrastructure the recent NPR endorsed three specific initiatives. First, it supports the planning towards the establishment of a modern pit production facility. The pit is a term used to refer to the fissionable material in the primary of a modern nuclear weapon. In most modern nuclear weapons, the fissionable material normally used is plutonium (see figure 4). During the height of the Cold War plutonium pits were produced at several of the national laboratories. Currently Los Alamos National Laboratory (LANL) has been attempting to reestablish this capability. Initial Department of Energy plans were for LANL to produce up to 50 pits annually.³⁰ Even if the US never builds a new weapon, it can be argued that a pit production facility is needed to produce pits for surveillance and testing to help ensure the safety of the stockpile, and to produce pits to replace pits in the stockpile due to unforeseen maintenance and aging problems.

Modern Thermonuclear Weapon

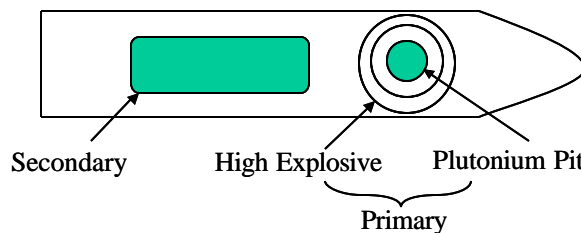


FIGURE 4³¹

Next the NPR supports a more prudent approach towards conducting a fully diagnosed all-up nuclear test. Although the United States has not ratified the Comprehensive Test Ban Treaty, it has been US policy not to conduct nuclear weapons tests since October 1992 when President George H.W. Bush signed the “Hatfield-Exon” amendment, which contained a moratorium on nuclear testing.³² As such this has placed a burden on the nuclear weapons infrastructure to maintain the reliability and aging of the nuclear weapons stockpile without being able to conduct an actual test. Additionally, not being able to test will significantly impact the ability to design, build, and test a new weapon if the need should arise. Even though the US has supported the moratorium on testing, it has been understood that some critical situation might arise where the US would need to conduct a fully instrumented nuclear test. The United States currently maintains a preparedness posture which would allow for a test to be conducted within 30-36 months of determining that it was needed. John Gordon, the administrator of the national nuclear security administration testified during hearings to the Senate armed services committee that “our current posture is a bit too relaxed, at 30-36 months for a fully diagnosed

all-up test.”³³ He did not specifically call for a reinstatement of nuclear testing, his point was that our nuclear infrastructure needs to be prepared to conduct a test in a shorter period of time should the need arise.

This leads to the third point on infrastructure as mentioned during the congressional hearings on the new NPR. As part of revamping the nuclear infrastructure, the NPR supports looking at future concepts in nuclear weapons which will challenge current weapon designers and assist in training new designers.³⁴ Although the NPR does not call for the design of any new weapons, it does recognize that many of the strategic targets that the United States might need to hold at risk are in hard to defeat deep underground facilities. As such, it does support an advanced concept initiative to study the modification of an existing system to meet this “bunker busting” requirement.³⁵

COMMAND, CONTROL, INTELLIGENCE, AND PLANNING

An important part of both the old and new triad is the command, control, intelligence, and planning that integrates the other components into a complete strategic system. The major components of the current strategic nuclear command, control, intelligence and planning system include survivable command posts with redundant and reliable communications, warning sensors and peacetime intelligence collection, and robust planning capabilities. The command posts are required to protect national leadership during attack. Sensors provide the necessary warning and information needed for decision makers to take appropriate protective measures and to direct an appropriate response. Communications carry the warning data to the command posts and are used to transmit orders from the command posts to the strategic forces.³⁶

Where as in the old triad, the command, control, intelligence, and planning were inherently understood to be part of the triad, the new triad specifically calls them out. These elements are shown in descriptions of the new triad as the glue or internal structure that holds the three legs of the new triad together. Command and control has always been important, particularly when commanding and controlling nuclear forces, but the new triad also recognizes the increased importance of intelligence and planning. The new strategic environment requires enhanced intelligence capabilities and faster and more adaptive strategic weapons planning capabilities.

STRENGTHS AND VULNERABILITIES OF THE NEW TRIAD

The nuclear and non-nuclear leg of the new triad offers several strengths and vulnerabilities. The major strength of this leg is the wider range of options that it offers to US national decision makers and US Strategic Command when responding to a crisis. With the old

triad, once it was determined that conventional force was not applicable the only other response available for a quick global strike was a nuclear ICBM, SLBM, or nuclear armed bomber. Including non-nuclear cruise missiles (and potentially non-nuclear ICBMs and SLBMs), global offensive information operations, and other non-nuclear weapons added into the strategic arsenal provide for a wider range of response options. Additionally they could provide for a response more appropriately tailored for the crisis. The major disadvantage of including non-nuclear global strike weapons (non nuclear kinetic weapons in particular) is the blurring of the line between nuclear and conventional war. Even though we have had global kinetic non-nuclear strike weapons such as cruise missiles in the arsenal for some time they have not been at danger in being confused with nuclear strike primarily because they were specifically separated from our strategic systems.

The major strength offered by incorporating ballistic missile defense systems into the new triad is that it could provide the option of not responding to a missile attack. Currently the major option the United States has to an intercontinental missile attack is to retaliate. The major vulnerability of the missile defense system is that the proposed system is an un-proven technology that will not be ready for fielding until at least 2004.

Creating a more responsive infrastructure will provide the advantage of being able to respond to new or emerging threats. Additionally, a responsive infrastructure will potentially provide faster response in correcting problems that might arise with the strategic arsenal. The vulnerabilities of having a responsive infrastructure are somewhat diffuse, but the strategic infrastructure, like deployed weapons, represents targets and additional points for attack or exploitation.

The strengths of the command and control, intelligence, surveillance and reconnaissance (C2ISR) leg of the new triad are twofold. First, it will improve the ability to conduct quick and efficient warfighting through faster planning and improved command and control. Next, it will add to the safety and security of the nuclear forces during the normal peacetime posture. An effective, efficient, and redundant C2ISR system will assist in preventing an accidental launch. Examples of how this will improve safety and security include ensuring commands are communicated reliably and error free, and by providing improved intelligence and surveillance to assist in distinguishing between real and perceived threats.

SUMMARY

The strengths and vulnerabilities of the "new triad" are summarized in the table below. Looking back at the period of the Cold War, the "old triad" could be judged as a good force

structure for the strategic requirements of that period. Only a sufficient passage of time will provide the insight as to whether or not the “new triad is the appropriate force structure for the current required strategic missions.

“New Triad” Component	Strengths	Vulnerabilities
Nuclear and non nuclear global strike	-provides additional offensive response options - response more tailored	-could blur the line between nuclear and conventional war
Missile Defense	-provides additional option other than retaliation	-un-proven technology not ready for fielding
Responsive Infrastructure	-provides ability to meet new or emerging threats -provides faster response for fixing problems with strategic arsenal	-creates additional points for attack
C2ISR	-improves ability to conduct warfighting -improves safety and security	-creates opportunity for computer network attack

TABLE 2

REASONS FOR THE NEW TRIAD

So why was this new strategic triad announced? In his testimony to the U.S. Senate, Undersecretary Feith stated that the new strategic triad was needed to address the key national security goals as outlined in the most recent National Security Strategy. These goals are to “assure our allies and friends; to dissuade future military competition, to deter threats against U.S. interests, allies, and friends; and decisively defeat any adversary if deterrence fails.”³⁷ Although these statements define the broad objectives the new triad must help accomplish, there are two key factors that help explain the addition of the new components. These are the new strategic relationship between the United States and Russia that has developed since the end of the Cold War and the appearance of terrorism and other asymmetric threats to the United States.

A NEW U.S – RUSSIAN STRATEGIC RELATIONSHIP

The new strategic relationship between Russia and the United States stimulated the restructuring of the traditional triad in two ways. First, the diminishing of the Soviet Union as a world power decreased the threat of massive nuclear attack and subsequently allowed the United States to rely less on the large nuclear force of the Cold War.³⁸ Russia does not present as high of a level of threat to the US as it did when the 1994 NPR was published. In 1994, as per requirements set forth by the START I treaty, both sides maintained 6000 accountable warheads. Additionally, both Russia and the United States realized that further reductions were possible and were working on the START II treaty that would reduce accountable warheads to the 3000-3500 levels. Recently analysts realized that even 3000 nuclear weapons were not necessary for either the United States or Russia. In recognition of this and as a further indicator of US decreased reliance on nuclear weapons for strategic security vis a vis a nuclear armed Russia, President George W. Bush announced a significant cut to between 1700 and 2200 operational nuclear weapons by 2012.³⁹ The new triad reflects this eventual reduction and decreased reliance on nuclear weapons by making nuclear weapons only one part of the new triad whereas in the past nuclear weapons made up the entire triad.

Next, the end of the Cold War allowed the administration to break away from the constraints of the ABM Treaty. This move has allowed the development of a National Missile Defense System that would have been a violation of the ABM Treaty in the past.⁴⁰ The move to develop a national missile defense system has been fueled by the proliferation of ballistic missile technology throughout the world. When the 1972 ABM treaty was negotiated only the Soviet Union had the capability to strike the continental United States with ballistic missiles. Now China and possibly North Korea have the potential to strike the United States with ballistic missiles and there are over 20 countries in possession of ballistic missiles that will only improve in range and accuracy as time goes on.

Defenses have historically been seen as a component of overall strategy. In the past, however, a ballistic missile defense system was seen as neither technically nor economically feasible. Although still expensive, technology has now advanced to the stage that a workable national missile defense system could be fielded within the next 10 years and limited capabilities fielded even earlier.

THE RISE OF TERRORISM AND NEW ASYMMETRIC THREATS

Another specific reason for the creation of the new strategic triad is the increased occurrence of terrorism and other new asymmetric threats. The events of 11 September, 2001

made the current Bush administration and all of the citizens of this country painfully aware of the new threats that face the United States. Magnifying the continued threat of large-scale attacks from terrorists is the threat from the potential use of weapons of mass destruction (WMD) against the United States or its allies. These threats indicate the wider range of strategic contingencies that the United States might need to respond to or, given the destructive power of WMD, might need to prevent or preempt in order to ensure the safety and security of the United States and its allies.

The old strategic triad, which relied only on nuclear weapons, would have little deterrent against further terrorist acts.⁴¹ Likewise, it would be difficult to use nuclear weapons to prevent or preempt the use of WMD against the US.⁴² The administration determined in both these cases that a wider range of options was needed as the threat of nuclear retaliation by itself may not be very credible.⁴³ As a result, non-nuclear strike capabilities and missile defense were added to deal with those threats that are significant strategically, yet fall short of the need for a nuclear response.

This begs the question of whether or not adding this wider range of nuclear and non nuclear options can adequately deter terrorism or the potential use of WMD against the US. In order to deter an adversary effectively one must have both capability and resolve. To deter an adversary they must clearly understand that you have the capability to do something to them that they do not want to have happen. In addition to this capability, the adversary must clearly understand that along with the capability comes the resolve to use this capability if necessary. Even when all of the above conditions are met, deterrence requires rationality on behalf of the adversary which is less likely to be the case when dealing with terrorist or other radical opponents.⁴⁴

Both the end of the Cold War and the rise of terrorist threats facing the United States have highlighted the need to improve and maintain the strategic infrastructure. This includes maintenance and improvement of the personnel and equipment that make up the nation's strategic nuclear forces. For example, John A. Gordon, Department of Energy, Under Secretary for Nuclear Security and Administrator, National Nuclear Security Administration, testified during House Armed Services Committee hearings that within the decade most of the US nuclear weapons designers with test experience will be eligible for retirement.⁴⁵ In addition to the nuclear weapons infrastructure, it was also recognized from a broader perspective that it is necessary to have a defense infrastructure that can respond to new threats in a much shorter timeframe than the standard 15-20 years.⁴⁶

The major benefit of the new triad is that it addresses the new strategic environment and specifically provides or intends to provide the additional capabilities to respond to these new threats. But along with these additional capabilities there are potential impacts on several key US security mechanisms that need to be considered.

OTHER EFFECTS OF THE NEW TRIAD

In an attempt to evaluate how well this new triad meets US current and future security needs an evaluation of its impact on key security mechanisms is useful. Therefore, the following specific questions will be addressed:

- 1) Will the new triad increase or decrease deterrence?
- 2) How will the new triad improve strategic warfighting?
- 3) Will the new triad improve or impair Crisis Stability?
- 4) How will the new triad affect Arms Control?

STRATEGIC DETERRENCE

Deterrence has been achieved when an adversary's course of action was averted because of the belief of unacceptable loss or punishment.⁴⁷ James Schlessinger, former Secretary of Defense wrote, "[t]he goal for the military might of the United States and its allies since the late forties has been to create an effective structure of deterrence that will preclude outright military assault...."⁴⁸ Because of the wider range of options provided, the "new triad" increases deterrence against the wider range of threats currently faced by the United States.

Deterrence calculus was a simple equation in the mid to late 1940s when the United States had clear strategic weapon superiority. As this advantage slipped away in the early 1950s, John Foster Dulles announced what was referred to as "the doctrine of Massive Retaliation". Under this doctrine the United States reserved the option to retaliate instantly. More importantly this doctrine allowed for the option that the United States might not necessarily respond where the aggression occurred, but might respond with attacks on other important strategic targets.⁴⁹

In comparison, the essence of flexible response, which became US policy in 1961, intended to emphasize the commitment to respond while avoiding specifically the form the response will take. This leaves the potential aggressor faced with the possibility of direct defense, escalation, or retaliation. Direct defense stops the aggression using force of a similar nature as to the original aggression. Escalation leaves open the possibility of using a higher form of response to stop the aggression. For example the act of using US nuclear weapons to counter a large conventional force would be an example of escalation. The final form of

response under the flexible response doctrine is the threat of retaliation. Retaliation stops aggression by conducting a devastating retaliatory strike on the aggressor's homeland.⁵⁰

The term "assured destruction" was used during the Kennedy administration to quantify the capability to inflict a devastating retaliatory blow on the Soviet Union in response to the most powerful strike that could be made first on the US. The capacity for this destruction became a mutual capability for both the US and the former Soviet Union and was known as mutual assured destruction or MAD.⁵¹ This became a reality in the 1970s with the development of survivable second strike capabilities by both the United States and the Soviet Union.

It could be argued that all of these policies have worked well to date since nuclear war did not occur. Therefore, it could be said that the policies effectively deterred nuclear war. However, the important question is not necessarily how well nuclear war was deterred in the past, but how well the United States is postured to deter nuclear war, WMD, or terrorist attacks now or in the near future.

Due to the warming of relations with Russia, deterring a Russian nuclear attack is not as important as it was in the past. Undersecretary Feith stated during congressional hearings that "Mutual Assured Destruction" is no longer United States policy and that we want a strategic force posture that is not premised on the incineration of Russia.⁵² The challenge of our current and future strategic forces is not only to meet this decreased deterrent requirement with respect to Russia, but also to deter the much wider range of threats that are inherent in the new strategic environment. In this perspective the nuclear weapons of the old triad themselves are not an effective deterrent for irrational terrorist organizations with no large high value targets. The other options offered by the new triad, such as global information strike, advanced global precision strike weapons, or a highly effective ballistic missile defense system might be more credible deterrents.

The missile defense system also will serve as a deterrent for countries attempting to develop ballistic missile capabilities or employ ballistic missiles against the United States. A workable ballistic defense system would negate the strategic advantages of an adversary's ballistic missiles. Since any missile fired at such a system would be shot down, it would be senseless for a country to attempt such an attack and risk the resulting counter strikes from the United States.

A comparison of the deterrence missions of the old and new triads is shown in the following table.

Old Triad Deterrent Missions	New Triad Deterrent Missions
Deter Soviet nuclear attack on US or allies	Deter Russian nuclear attack on US
Deter Chinese Nuclear attack on US or allies	Deter Chinese Nuclear attack on US or allies
Deter Soviet conventional attack on US or allies	Deter nuclear attack by undeclared/unconfirmed nuclear states (Pakistan, India, North Korea, etc.) against the US
Deter use of chem./bio against the US or allies.	Deter use of chem./bio or other WMD against the US or allies.
	Deter Terrorism against the US

TABLE 3

STRATEGIC WARFIGHTING

Relatively speaking, the recent NPR and the new triad strengthen the nuclear force structure. The triad still includes all three legs of the traditional “old triad” embedded in one of its corners. And, in spite of the fact that the NPR calls for a reduction of the numbers of operationally deployed weapons, the glide slope for these reductions is not as steep as those proposed by President Clinton and the previous administration (see figure below).

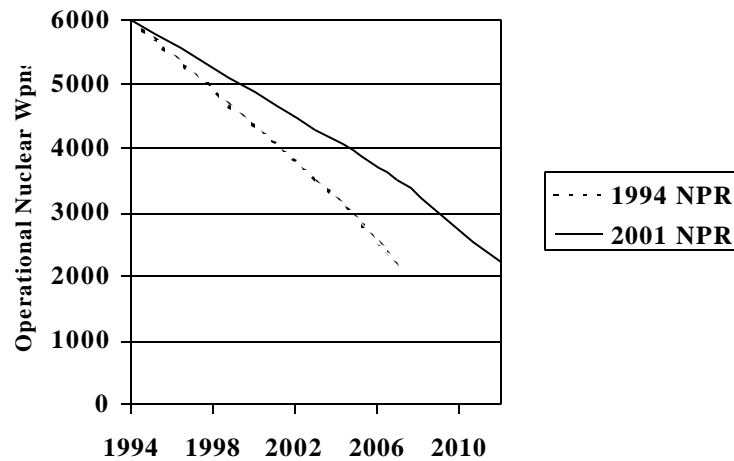


FIGURE 5⁵³

At Helsinki in 1997, President Clinton pledged to work towards reductions in the number of nuclear warheads to between 2000 and 2500 by 2007. The 2001 NPR, in concert with the reductions agreed to by President Bush and President Putin reduces the operationally deployed nuclear weapons to 3800 by 2007.⁵⁴

Currently the force structure of STRATCOM consists of control over ICBMs, nuclear submarines equipped with nuclear tipped sea launched ballistic missiles, and nuclear armed bombers. With the creation of the new triad and the inclusion of non nuclear weapons into the strategic arsenal it appears that STRATCOM will also need to have non nuclear weapons included in its forces. This could include conventional cruise missiles and emerging advanced technology weapons that have yet to be identified. The Pentagon is also considering converting some ICBMs into non-nuclear weapons by replacing the nuclear warhead with a conventional warhead possibly drawn from an array of high explosives or other specialized payloads.⁵⁵

The new NPR referred to the concern that a large number of countries have underground facilities that are used for military purposes and in general current weapons can only deny or disrupt the functioning of these facilities. The NPR further pointed out some of the operational limitations of the only earth penetrating nuclear weapon in the arsenal.⁵⁶ The United States has not produced a nuclear warhead in over ten years and currently does not have the capability to build a new warhead from scratch. The only capability that the United States has to build a new nuclear weapon is by mixing and matching components from existing weapons.⁵⁷ Even though the new triad maintains the current nuclear force structure for strategic warfighting and proposes to place increased emphasis on the nuclear weapons infrastructure it falls short of pushing for upgrading US nuclear weapons in order to hold all target type at risk. The 2001 NPR only calls for an advanced concept initiative to study the modification of an existing nuclear weapons system for use as a robust nuclear earth penetrator.⁵⁸

Placing an increased emphasis on C2ISR and planning will help improve strategic warfighting. Through improved planning capabilities the strategic forces will be better prepared for warfighting by being able to more efficiently match targets, timing and weapons. Upgraded command and control systems will provide for improved execution of these plans through faster and more reliable and redundant systems to transmit and verify orders.

CRISIS STABILITY

The addition of non-nuclear strike capabilities to the “new triad” may decrease crisis stability. First, it could blur the line between non-nuclear and nuclear strike. This confusion could be inherently unstable during a crisis if an adversary with nuclear capabilities mistook a non-nuclear strike for a nuclear attack. Additionally, having strategic non-nuclear strike capabilities could add to instability during a crisis by the very fact that it would make it easier for the United States to attack an adversary instead of utilizing non-military elements of national power, i.e., information, economic, or diplomatic means.

Although the fielding of a national missile defense system may offer the potential of protection to certain parts of the United States, the question is whether or not crisis stability would be enhanced. Thomas Schelling and Morton Halperin argue that imperfect defense systems do not promote stability; on the contrary, they increase the risk of war by creating an incentive for the other side to strike first.⁵⁹ As another example of the national missile defense systems impact on crisis stability, the Chinese government portrays NMD as disruptive to international stability by disturbing the strategic balance between the United States and Russia and by constituting a direct threat to the effectiveness of China's limited nuclear force.⁶⁰ Although there has been no overt action to counter the US decision to field a ballistic missile defense system, it still might be a catalyst for China - or possibly even Russia at some future date - to make improvements to their strategic arsenal in an attempt to re-balance their strategic forces with respect to the United States. This would be the classic security dilemma in action.⁶¹ On the other hand the building of a highly effective national missile defense system could improve crisis stability in that it could help prevent escalation of a crisis. Having an effective defensive system could allow the United States to move back from a “hair trigger” or launch on warning posture and allow for another means to respond to a missile attack against the United States other than simply relying on a retaliatory launch.

ARMS CONTROL

Arms control treaties have contributed to the security of the United States. The Intermediate Nuclear Forces (INF) Treaty and the Strategic Arms Reduction Treaty I (START I) resulted in the deactivation of thousands of nuclear weapons. Another less publicized benefit has been the trust and mutual respect that has been gained between Russia and the United States as a result of the on-site inspection provisions of the treaties.

Within the framework of the Nuclear Non-Proliferation Treaty (NPT) the five declared nuclear weapon states – China, France, Russia, the United Kingdom, and the United States –

agreed to work towards nuclear disarmament. In return all other signatories agreed to renounce nuclear weapons entirely.⁶² The nonproliferation regime has not been completely successful in stopping other nations from developing nuclear weapons, but it has provided some benefits.

One such benefit has been the efforts of the International Atomic Energy Agency (IAEA). Over 180 countries have pledged to refrain from efforts to build nuclear weapons and the IAEA checks adherence to this pledge by monitoring nuclear facilities around the world. It might be argued that cooperation to promote the peaceful use of atomic energy has provided the first steps for covert nuclear weapons programs (as in the case of India), but in general the IAEA has been effective in slowing the spread of nuclear weapons. Enhanced intrusiveness under a 1997 plan will improve the IAEA's capability to detect and deter violations.⁶³

In spite of the large number of signatories to the NPT and the positive impact of the IAEA in monitoring nuclear facilities, more progress is possible. The major complaint some countries have with the Nonproliferation treaty has to do with balanced obligations. "Most non-nuclear states [believe] that their renunciation of nuclear weapons should be accompanied by a commitment on the part of the nuclear powers to reduce their arsenals and to make progress towards comprehensive disarmament."⁶⁴ A stronger leadership role by the United States in moving towards disarmament by making nuclear weapons reductions and in promoting the peaceful use of nuclear energy might assist in alleviating this perception. In particular, by an analysis of the numbers of nuclear weapons listed in the 2001 NPR, it might seem as if the US has no intention at all of moving towards comprehensive disarmament.

On the subject of nuclear arms reductions, Senator Levin argued during Congressional hearings that the recent NPR and the "new triad" do not represent much change from the force structure presented in the 1994 NPR. While questioning Dr Feith, Senator Levin pointed out that when comparing the 1994 NPR and the 2002 NPR there was not much difference other than the fact that "[it moved] lots of warheads into storage away from their delivery systems."⁶⁵ The following table shows a comparison of the 1994 NPR force structure and the 2002 force structure.

Delivery System	1994 NPR	2002 NPR
B52	66	76
B2	20	21
Trident Submarines	14	14
ICBMs	500-450	500 ⁶⁶

TABLE 4

As a result from the numbers shown in Table 4, it would be hard to convince other nations that the United States is leading the world in making drastic cuts to its strategic nuclear force.

Former Senate Majority Leader Howard Baker and former White House Counsel Lloyd Cutler concluded in a 2001 bipartisan task force that “[t]he most urgent unmet national security threat to the United States is the danger that weapons of mass destruction or weapons usable material in Russia could be stolen and sold to terrorist or hostile nation states and used against American troops abroad or citizens at home.”⁶⁷ In Senate Armed Services Committee hearings, Senator Levin went further when he said, “[b]y failing to destroy nuclear warheads, the Nuclear Posture Review would increase the threat of proliferation at the very time when the al Qaeda terrorist network is known to be pursuing nuclear weapons.”⁶⁸

Regardless of the changes in the recent NPR with respect to the description of the new triad, there is little evidence that the actual nuclear force structure has significantly changed. Dr Feith argued during congressional testimony that there will be continued reductions in the number of operationally deployed warheads. Although this point is accurate, the more important issue is that these warheads will not necessarily be destroyed, but in most cases they will be placed in storage. Several of the Senators made the important counter point that if we take nuclear weapons off delivery systems and place them in storage instead of destroying them, the Russians will most likely do the same thing.⁶⁹ This chain of events will have done very little to decrease the total number of nuclear weapons in U.S. and Russian arsenals. Although, there are some valid reasons for not destroying US warheads as part of a unilateral or formal agreement, specifically the asymmetry in new weapon production capability between the United States and Russia, it still sends the wrong nonproliferation message to the rest of the world.

CONCLUSION

During the past five decades, US nuclear policy has evolved in an ongoing attempt to meet the challenges of a changing strategic environment. Changes have been made in both nuclear employment policy and in force structure with the goal of meeting the security

requirements of the country. In this sense the 2001 Nuclear Posture Review has been no different. It both indicated the United States' departure from the policy of mutual assured destruction and it described changes in the strategic force structure in order to meet the security challenges of the current strategic environment. This paper reviewed the 2001 NPR and specifically discussed the "old triad" and the "new triad" and the impacts that the "new triad" will have on nuclear deterrence, strategic warfighting, crisis stability, and arms control. The following table summarizes the results of these impacts.

	Improves	Degrades
Deterrence	✖	
Strategic Warfighting	✖	✖
Crisis Stability		✖
Arms Control		✖

TABLE 5

There are two significant changes described in the new triad that represent a significant departure from previous policy. These changes were adding ballistic missile defense as a leg of the new triad, and including non-nuclear strike with current nuclear strike capabilities as another leg. While the inclusion of ballistic missile defense might somewhat degrade US efforts in the arms control arena, an effective missile defense system will generally improve the security of the United States through improved deterrence and by enhancing crisis stability as it will eliminate the need to maintain the de-stabilizing posture of launch on warning. Although it may be difficult for a ballistic missile system to protect against a large scale attack from Russia or China, it will provide a more credible deterrent or defense against an attack from a rogue nation with limited ballistic missile capability. In spite of the fact that the missile defense system will not be operational until at least 2004 and then only with limited capabilities, it is still a good addition to the new triad.

Strategic Warfighting is both improved and degraded by changes described in the "new triad." The most recent NPR changes our nuclear force structure (old triad) very little. Although reductions in operational numbers will occur, sufficient nuclear strike capabilities will remain with

the nuclear bombers, ICBMs and SLBMs of the “old triad”. Adding new global strike technologies and improving C2ISR will improve the ability to conduct nuclear warfighting. The downside of the “new triad” is that it does not go far enough in calling for the modification or development of new nuclear weapons to meet the new requirements of the current security environment. An example is the shortcomings in being able to sufficiently hold hard and deeply buried targets at risk. A specific program within the 2001NPR to develop a weapon for this mission is needed and would further improve strategic warfighting capabilities.

The 2001 NPR and the “new triad” have a negative impact on crisis stability. The inclusion of non nuclear strike should be limited to non-kinetic attack mechanisms only. This will prevent the blurring of the line between nuclear and conventional attacks. It is difficult technically to distinguish between conventional and nuclear cruise missiles and even more difficult to distinguish between conventional and nuclear armed ICBMs regardless of whether they are part of the “new triad” or not. Therefore, keeping conventional weapons separate from the “new triad” and STRATCOM control would be one way of signaling that they are non-nuclear. In today’s situation, most of our adversaries know that when STRATCOM becomes involved in a crisis it means that nuclear options are being considered. Mixing kinetic conventional weapons into STRATCOM’s arsenal would confuse this clear signal. The new triad should only include added capabilities in the area of information operations and other advance non-kinetic systems that could not be confused with nuclear weapon systems. If advanced conventional or other kinetic strike capabilities are deemed necessary, these capabilities could be developed, maintained, and operated by other regional warfighting combatant commands in a similar manner as they are today.

In contrast, ballistic missile defense can also increase crisis stability in that it could negate the need to maintain launch on warning posture or the need to retaliate in kind, provided it could defend missile fields as well as cities. Having an effective missile defense system would increase stability in a crisis in that as a minimum it will give decision makers additional options and more time before deciding how to respond to an incoming missile. However, the degradation of crisis stability due to the blurring of the line between nuclear and non-nuclear war as discussed above outweighs this benefit since even a limited missile system won’t be fielded for several years. Additionally, it is yet to be determined how effective this system will be.

As mentioned previously, the most recent NPR changes our nuclear force structure (old triad) very little. The new NPR actually calls for a slowing down of the nuclear weapons reductions that were proposed by the previous administration. This does not help in the efforts

to promote arms control efforts such as the non proliferation treaty or other strategic arms treaties.

The descriptions of robust infrastructure as another leg of the new triad and the description of the C2ISR that holds all corners of the new triad together seems to be “window dressing.” Infrastructure and C2ISR have always been and will continue to be necessary parts of any strategic force structure. Including them as part of the new triad causes confusion and draws attention away from the core components. Although the importance placed in these areas is needed and will be beneficial, other means should be used to bring attention to them other than making it specifically part of the new triad. Making them part of the triad detracts from the core offensive and defensive strike systems of the triad.

Inclusion of national missile defense as part of the new triad was a positive move. However, the inclusion of non nuclear strike, infrastructure, and C2ISR should not have been included. Mixing of non-nuclear global strike should be limited to non-kinetic global weapons. Infrastructure and C2ISR programs can be described in other venues and do not need to be part of the new triad per se. In consideration of the above comments, depicted below is a modified new triad for consideration⁷⁰.

Modified New Strategic Triad

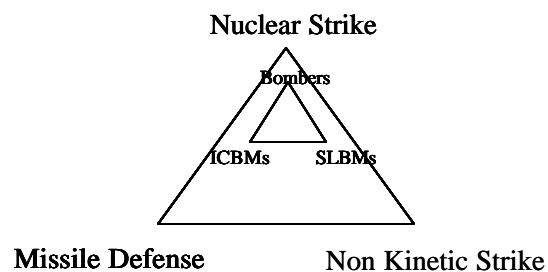


FIGURE 6

This “improved new triad” offers all the benefits of the “new triad” as described in the 2001 Nuclear Posture Review, yet it eliminates those parts that have a negative impact on the key security mechanisms of deterrence, strategic warfighting, crisis stability, and arms control. It keeps ballistic missile defense as one of the key future benefits to strategic capabilities. It removes non-nuclear kinetic strike in that adding this with nuclear strike capabilities could decrease crisis stability. The “improved new triad” keeps non-nuclear non-kinetic strike as a

part of the strategic force not only because there will be an increasing need for computer network attack and other types of information warfare in the future, but also because these operations are often global in nature and usually not within clear borders. Non-kinetic attacks do not run the risk of being confused with nuclear attacks as a kinetic attack might. This “improved new triad” also does not include C2ISR and the responsive infrastructure as discussed in the 2001 NPR’s new triad. These two items have always been and will always be an inherent part of the nuclear force structure. This “improved new triad” might be one way to refine and clarify the intent and goals of the 2001 NPR without sacrificing the capabilities needed to meet the requirements of the changed security environment.

Just as nuclear policy has evolved during the last 50 years it will most likely continue to evolve for the next 50 years or for at least as long as the United States has nuclear weapons. The real value of the 2001 NPR and the “new triad” is the debate that it generates among all groups in a position to shape future U.S. nuclear policy.

WORD COUNT = 9340

ENDNOTES

¹ United Nations for Disarmament Affairs, Nuclear Weapons, A Comprehensive Study, (New York: United Nations Publications, 1991), 13.

² The fact that DoD was directed by President Clinton to conduct the 1994 and the quote from Secretary Aspin was provided was provided through a 6 February 2003 email from Dr Vince Giroux, Historian, United States Strategic Command.

³ For a list of important strategic nuclear documents since 1948, see Appendix C of David M. Kunsman's, and Douglas B.L. Lawson's, "A Primer on US Strategic Nuclear Policy," Sandia Report 2001-0053, (Sandia National Laboratory, Jan 2001).

⁴ This chart was constructed from information contained on page 8 of a Department of Defense-Joint Chiefs of Staff briefing titled "Nuclear Posture Review." The briefing was included as an attachment to a 22 September 1994 News Release (No. 541-94) from the Office of the Assistant Secretary of Defense (Public Affairs).

⁵ Section 1041, National Defense Authorization Act for Fiscal Year 2001 (Public Law 106-398), 30 October 2000.

⁶ Ibid.

⁷ This information was obtained from page 3 of the 9 January 2002 Department of Defense briefing slides titled, "Findings of the Nuclear Posture Review." A copy of the slides can be found on the internet at <<http://www.wslfweb.org/nukes/npr.htm>>.

⁸ In 1994 Russia was still armed with 25,000 nuclear weapons. See remarks by Secretary of Defense William Perry contained in the 22 September 1994 news release cited in note 4.

⁹ Charles A. Krupnick, United States Army War College, Department of Distance Education, personal discussions, 3 February 2003.

¹⁰ At the writing of the 1994 NPR, START I had been ratified but not entered into force. During the 22 September 1994 press conference, Deputy Secretary of Defense John Deutch stated that "the force structure [outlined in the 1994 NPR] permits options for START II and to go to even larger and more far-reaching reductions, should the political circumstances warrant." See news release cited in note 4.

¹¹ "The President's News Conference With President Vladimir V. Putin of Russia in Moscow," Weekly Compilation of Presidential Documents, (Washington, D.C.: U.S. Government Printing Office, 27 May 2002), vol. 38, no. 21, 887.

¹² Congress, Senate Armed Services Committee, U.S. Senator Max Cleland (D-GA) Holds Hearings on the Nuclear Posture Review, 14 February 2002; (25431 words) [database on-line] available from Lexis-Nexis, accessed 24 September 2002, 36.

¹³ Although I have not found any reference which explains how the term "Triad" originated, an article published by the Congressional Budget Office in June of 1978 titled "Planning U.S.

Strategic Nuclear Forces for the 1980's" mentioned that the United States has had a three-part system or Triad of Strategic forces since the 1960's.

¹⁴ Even though the components of the triad were traditionally shown on the points of the triangle, they are most often referred to as legs of the triad as if they actually represented the sides of the triangle.

¹⁵ Robert Joseph and Barry Blechman, "Deterring Chemical and Biological Weapons," in Transforming Nuclear Deterrence, ed. Hans Binnendijk and James Goodby (Washington D.C.: National Defense University Press, 1997), 10.

¹⁶ Congress, Senate Armed Services Committee, Testimony by Admiral James O. Ellis, Commander in Chief, United States Strategic Command, 20 March 2002, p.3 (5223 words) [database on-line]; available from Lexis-Nexis; accessed 24 September 2002.

¹⁷ Ashton B. Carter, "The Command and Control of Nuclear War," Scientific American, January 1985, 33.

¹⁸ See footnote 11, page 50, in Gwendolyn M. Hall, John T. Capello, and Stephen P. Lambert, "A Post-Cold War Nuclear Strategy Model," INSS Occasional Paper 20, Arms Control Series, July 1998.

¹⁹ Alan J. Parrington, "Mutually Assured Destruction Revisited"; available from <<http://www.airpower.maxwell.af.mil/airchronicles/apj/apj97/win97/parrin.html>>; Internet; accessed 1 April 2003.

²⁰ Congress, Senate Armed Services Committee, U.S. Senator Max Cleland (D-GA) Holds Hearings on the Nuclear Posture Review, 9.

²¹ This figure was reproduced from one found on page 9 of the 9 January 2002 Department of Defense briefing titled, "Findings of the Nuclear Posture Review."

²² Congress, Senate Armed Services Committee, U.S. Senator Max Cleland (D-GA) Holds Hearings on the Nuclear Posture Review, 5.

²³ *Ibid.*, 9.

²⁴ "Nuclear Posture Review [Excerpts]" available from <<http://www.globalsecurity.org/wmd/library/policy/dod/npr.htm>>; Internet; accessed 13 February 2003, 7.

²⁵ David Martin, "Ballistic Missile Defense," July 2002; available from <<http://usinfo.state.gov/journals/itps/0702/ijpe/martin.htm>>; Internet; accessed 12 January 2003.

²⁶ Wade Boese, "Bush to Deploy 'Modest' Missile Defense in 2004," Arms Control Today January/February 2003: available from <http://www.armscontrol.org/act/2003_01-02/missiledefense_janfeb03.asp>; Internet; accessed 11 February 2003.

²⁷ *Ibid.*, 2.

²⁸ "Build the Shield," Investor's Business Daily, 17 June 2002, sec. A, p. 16, (510 words) [database on-line]; available from Lexis-Nexis; accessed 27 September 2002.

²⁹ Congress, Senate Armed Services Committee, U.S. Senator Max Cleland (D-GA) Holds Hearings on the Nuclear Posture Review, 11.

³⁰ U.S. Department of Energy, Office of Inspector General, Office of Audit Services, Audit Report: Management of the Nuclear Weapons Production Infrastructure DOE/IG-0484 (Washington, D.C.: U.S. Department of Energy, September 2000), 4.

³¹ This drawing of a modern nuclear weapon was adapted from a picture in an article titled "An Overview of Present and Future U.S. Plutonium Pit Production." This article can be found at the Nuclear Watch New Mexico website at www.nukewatch.org.

³² This information was found on pages 1 and 2 of the 1990-1994 chronology of key events concerning the effort to end nuclear weapons testing compiled by Daryl Kimball. This chronology can be found on the internet at the Comprehensive Test Ban Treaty Site *Coalition to Reduce Nuclear Dangers*, <<http://www.clw.org/pub/clw/coalition/ctchro90.htm>>.

³³ Congress, Senate Armed Services Committee, U.S. Senator Max Cleland (D-GA) Holds Hearings on the Nuclear Posture Review, 13.

³⁴ *Ibid.*, 13.

³⁵ *Ibid.*, 26.

³⁶ Carter, 33.

³⁷ George W. Bush, The National Security Strategy of the United States of America (Washington, D.C.: The White House, September 2002), 29.

³⁸ J.D. Crouch, "Special Briefing on the Nuclear Posture Review," briefing slides with scripted commentary, DoD News Briefing, 9 January 2002. Available from <<http://usinfo.state.gov/topical/pol/arms/stories/review.htm>>; Internet; accessed 15 September 2002.

³⁹ Nicholas M. Horrock, "Bush, Putin Sign Historic Arms Agreement," United Press International, 24 May 2002. sec. General News, (794 words). Database on-line. Available from Lexis-Nexis. Accessed 7 Oct 2002.

⁴⁰ "Build the Shield," Investor's Business Daily, 17 June 2002.

⁴¹ Bush, 15.

⁴² See Gary L. Guertner, "Deterrence and Conventional Military Forces," in Deterrence in the 21st Century, ed. Max G. Manwaring (London, Frank Cass, 2001), 66-67. Mr. Guertner suggests that rather than nuclear weapons, modern high-tech conventional weapons offer a more plausible range of options for preemption of or responding to a nuclear or chemical attack.

⁴³ Andrew Krepinevich and Robert Martinage, The Transformation of Strategic Strike Operations, (Washington, D.C.: Center for Strategic and Budgetary Assessments, March 2001), 15.

⁴⁴ I was reminded of this point during a review of this paper by Dr. Charles A. Krupnick, United States Army War College, Department of Distance Education.

⁴⁵ Congress, House of Representatives, House Armed Services Committee, Atomic Energy Defense Activities Budget: Testimony by John A. Gordon, Secretary for Nuclear Security and Administration, 27 June 2001, p. 29 (22003) [database on-line]; available from LexisNexis; accessed 8 October 2002.

⁴⁶ See the speaker's notes to slide 9 of the J.D. Crouch "Special Briefing on the Nuclear Posture Review."

⁴⁷ David M. Kunsman and Douglas B.L. Lawson, 9.

⁴⁸ James R. Schlesinger, "The Evolution of American Policy Towards the Soviet Union," International Security, Summer 1976, 1:1, 42.

⁴⁹ Nuclear Weapons, A Comprehensive Study, 45.

⁵⁰ *Ibid.*, 161.

⁵¹ Michael Mandelbaum, The Nuclear Future (Ithaca, N.Y.: Cornell University Press, 1983), 19.

⁵² Congress, Senate Armed Services Committee, U.S. Senator Max Cleland (D-GA) Holds Hearings on the Nuclear Posture Review, 22.

⁵³ The information used to construct this chart was found on page 5 of the 14 February 2002 Senate Armed Services Committee, Hearings on the Nuclear Posture Review.

⁵⁴ *Ibid.*

⁵⁵ Eric Schmidt, "U.S. Considers Conventional Warheads on Nuclear Missiles," New York Times, 24 February 2003, sec. A, p. 9.

⁵⁶ "Nuclear Posture Review [Excerpts]," 15.

⁵⁷ Congress, Senate Armed Services Committee, U.S. Senator Max Cleland (D-GA) Holds Hearings on the Nuclear Posture Review, 19.

⁵⁸ *Ibid.*, 26-27.

⁵⁹ Cited in Hall, Cappello, and Lambert, 13.

⁶⁰ Michael J. Finnegan, "Implications of Ballistic Missile Defense for the Security and Stability of Northeast Asia," in Nuclear Deterrence and Defense: Strategic Considerations, ed. James M. Smith (INSS Book Series, February 2001), 116.

⁶¹ Charles A. Krupnick, United States Army War College, Department of Distance Education, reminded me of this point during a review of this paper, 25 March, 2003.

⁶² "The effects of Arms Control, Pushing the Limits, The Decision on National Missile Defense"; available from <<http://www.clw.org/pub/clw/coalition/nmdbook00armscontrol.htm>>; Internet; accessed 12 January 2003.

⁶³ "The International Atomic Energy Agency," available from <<http://www.usun-vienna.rpo.at/iaea.htm>>; Internet; accessed 2 March 2003.

⁶⁴ "Treaty on the Non-Proliferation of Nuclear Weapons," available from <<http://www.state.gov/www/global/arms/treaties/npt1.html>>; Internet; accessed 15 March 2003.

⁶⁵ Congress, Senate Armed Services Committee, U.S. Senator Max Cleland (D-GA) Holds Hearings on the Nuclear Posture Review, 17.

⁶⁶ "Nuclear Posture Review [Excerpts]" 8 January 2002; available from <<http://www.globalsecurity.org/wmd/library/policy/dod/npr.htm>>; Internet; accessed 26 January 2003. The numbers listed for ICBMS may be misleading in that the number for both the 1994 and 2001 NPR are listed differently in various sources. It is probably accurate to say that the ICBM force has been around range of 500 for both. The other misleading piece of information not reflected in this table is that the 2001 calls for the deactivation of 50 Peacekeeper missiles leaving only Minuteman III missiles to make up the US ICBM force.

⁶⁷ See also Congress, Senate Armed Services Committee, U.S. Senator Max Cleland (D-GA) Holds Hearings on the Nuclear Posture Review, 29.

⁶⁸ *Ibid.*, 3.

⁶⁹ *Ibid.*, 2.

⁷⁰ See Andrew Krepinevich and Robert Martinage, The Transformation of Strategic Strike Operations, page 29. In this report Krepinevich and Martinage also suggest a new triad that differs from the one proposed in the 2001 NPR. The key difference between the "improved new triad" that I propose when compared to both the 2001 NPR new triad and the one proposed by Krepinevich and Martinage is the exclusion of non-nuclear kinetic strike weapons.

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